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Philippines

Biofuels Annual

Philippine Biofuels Situation and Outlook

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Report Highlights:

Consistent with the Philippine Department of Energy's expectations, demand for ethanol is expected to increase by an average of five percent annually in the near future in order to meet the 10 percent mandated ethanol blend. While local ethanol production is expected to increase through 2016 due to a modest buildup in capacity as some potable alcohol producers' shift to fuel ethanol production, meeting the current 10 percent ethanol blend in gasoline will still be inadequate. As a result, imports are expected to decline from 339 million liters (MLi) in 2014 to 302 MLi in 2015, declining again to 251 MLi in 2016. For biodiesel, there have been no compliance issues with the mandated two percent blend, and production is expected to be sufficient even at a higher five percent blend by late 2015.

Post:
Manila

I. Executive Summary:

The Biofuels Act or Republic Act (RA) 9367 was signed in January 2007 making the Philippines the first country in Southeast Asia to have biofuels legislation in place. RA 9367 mandated that by February 2009, the annual total volume of gasoline sold and distributed by oil companies in the country shall comprise at least five percent ethanol, increasing to a ten percent blend by February 2011. RA 9367 also mandated a minimum one percent biodiesel blend in all diesel fuels by February 2007, to increase to a two percent blend after 2 years. Sugarcane and molasses are used in Philippine ethanol production, and coconut methyl ester (CME) is the preferred biodiesel feedstock. Mainly due to the expanding population and continued growth of the Philippine economy, overall fuel consumption is expected to continue increasing through 2025. According to the Philippine Department of Energy (DOE), local ethanol demand reached 455 million liters (MLi) in 2014, and is expected to grow by an average of 5 percent annually in the near future. The Biofuels Act gives priority to local ethanol over imports, and disallows biodiesel importation.

Meeting the current 10 percent ethanol blend in gasoline has been problematic using local ethanol; while there have been no issues complying with the mandated 2 percent blend for biodiesel. RA 9367 raises the current 10 percent ethanol blend to 20 percent by 2020, and the 2 percent biodiesel blend to 5 percent by 2015, 10 percent by 2020, and to 20 percent by 2030. Consistent ethanol production shortfalls have forced the DOE to allow imports. Overall imports in 2014 reached 339 MLi from 297 MLi in 2013. Despite being disadvantaged by higher tariffs compared to regional sources, U.S. ethanol accounted for 73 percent of total imports in 2014, with sales reaching a record 246 million liters. The Philippines was the 4th largest market for U.S. ethanol in 2014.

Ethanol production is expected to increase in the next 2 years as capacity slowly builds up due to a shift by local potable alcohol distilleries to fuel ethanol production. As a result, imported ethanol is expected to decline to 302 MLi and 251 MLi in 2015 and 2016, respectively. By 2016, ethanol imports are predicted to account for roughly half of total demand at 250 MLi. During the same year, there will likely be 12 distilleries with a total capacity of 342 MLi operating at 73 percent utilization. This optimistic scenario assumes there is adequate sugarcane supply at affordable prices.

For biodiesel, output in 2015 is predicted to reach 190 MLi from 172 MLi in 2014, before surging to 350 MLi in 2016 as a result of the implementation of a 5 percent blend mandate. Compliance is expected through 2016, although issues are expected to surface by 2020 and beyond when the blend rate is raised.

Author Defined:

II. Policy and Programs

Fuel Use Projections (Million Liters)										
Calendar Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Gasoline Total	5,013	5,264	5,474	5,693	5,921	6,128	6,343	6,565	6,762	6,964
Diesel Total	9,228	9,689	10,077	10,480	10,899	11,281	11,676	12,084	12,447	12,820
On-road	7,253	7,616	7,920	8,237	8,567	8,866	9,177	9,498	9,783	10,076
Agriculture										
Construction/mining										
Shipping/rail										
Industry										
Heating										
Jet Fuel Total	2,122	2,200	2,280	2,364	2,450	2,540	2,633	2,729	2,829	2,933
	16,363	17,153	17,831	18,537	19,270	19,949	20,651	21,378	22,037	22,717
Total Fuel Markets										

The lead agency responsible for the Philippine Biofuels Program is the DOE. The country's biofuels strategy is expressed in the National Biofuels Plan (NBP) which is based on the Philippine Energy Plan (PEP). The PEP reflects the Philippine government's (GPH) mission to ensure the delivery of secure, sustainable, sufficient, affordable and environment-friendly energy to all economic sectors. The NBP, on the other hand, is a preliminary assessment of the previous year's NBP, and outlines the short-, medium- and long-term plans of the National Biofuels Board (NBB). The NBB is chaired by the DOE. Both the PEP and the NBP are often reviewed, and assumptions adjusted. To date, the PEP 2013-2030, however, has not been released. Unless otherwise specified, energy figures in this report are largely based on preliminary data from the Sugar Regulatory Administration (SRA), the DOE, NBP 2013-2030 and the PEP 2012-2030.

The Biofuels Act was signed in January 2007 making the Philippines the first country in Southeast Asia to have legislation mandating that biofuels be blended into local gasoline and petroleum diesel. Section 2 of RA 9367 cites the law as a measure to:

- Develop and utilize indigenous renewable and sustainable-sources clean energy to reduce dependence on imported oil.
- Mitigate toxic and greenhouse gas (GSG) emissions;
- increase rural employment and income; and
- Ensure the availability of alternative and renewable clean energy without any detriment to the natural ecosystem, biodiversity and food reserves of the country.

The Biofuels Act mandates that all liquid fuels for motors and engines sold in the Philippines shall contain locally-sourced biofuels components. The law requires that by February 2009, at least 5 percent ethanol shall comprise the annual total volume of gasoline sold and distributed by oil companies in the country, increasing to a 10 percent blend by 2011. The current 10 percent blend is to be raised to 20 percent by 2020, according to the RA 9367.

Ethanol Demand	
Low Carbon Scenario	Blend

Year	%
2009	5
2011	10
2020	20

Source: Department of Energy

RA 9367 also mandated the use of a minimum one percent biodiesel blend in all diesel fuels by February 2007, to increase to a 2 percent blend by 2009. Higher blends are programmed as follows:

Biodiesel Demand	
Low Carbon Scenario	Blend
Year	%
2007	1
2009	2
2015	5
2020	10
2030	20

Source: Department of Energy

To encourage investments, fiscal incentives are provided by RA 9367. Entities engaged in the plantation of biofuels feedstocks are entitled to duty-free importation and value added tax (VAT) exemption on all types of agricultural inputs and machinery. Priority is also given to potential biofuels investors by government financing agencies. Section 5.2 of the Biofuels Act allows ethanol importation only up to four (4) years after its implementation or 2013. RA 9367 does not provide for biodiesel importation.

In 2008, RA 9367 was strengthened with the passing of the Renewable Energy Act or Republic Act 9513 (RA 9513). When the Renewable Energy Act was signed, the country was already world's second largest producer of geothermal energy (next to the U.S.) and was also the first country in Southeast Asia to establish a commercial wind farm as well as the first grid-connected solar photovoltaic power plant.

The Philippine government (GPH) has set a goal to triple renewable energy capacity through 2030 under the Philippines energy plan. Post estimates renewable energy sources to currently account for around 35 percent of overall primary energy supply.

The Philippine sugarcane and sugar processing industry is inefficient by world standards and suffers below-average yields. This raises the cost of ethanol from what it would be otherwise when supported by an efficient industry. In support of the domestic sugar industry, on March 27, 2015, Republic Act 10659 (RA 10659) or the "Sugarcane Industry Development Act" was signed into law. The Act promotes and supports the competitiveness of the sugarcane industry by providing P2 billion (\$44.4 million) for infrastructure support programs, research and development, socialized credit, grants to block farms and scholarship grants. While RA 10659 may improve efficiency of existing sugarcane farms, a current land reform program inhibits the expansion of plantation farms.

By 2020, the aspirational goal is to raise the ethanol mandate to 20 percent, and the biodiesel blend increased to 10 percent (increasing to 20 percent by 2030). However, existing production capacity will only support marginal increases in blending that fall far short of targets, and delivery infrastructure is entirely inadequate for such large increases. Furthermore, a move the E20 without a major shift to a

new vehicle fleet able to accommodate higher blends presents risks. For biodiesel, a local expert believes algal biodiesel would be necessary to augment feedstock supply in order to comply with the B20 blend by 2030.

III. Ethanol

Production

The Philippine ethanol and sugar industries are highly interdependent. The local sugar industry traditionally has been a single-product industry. The country is a major sugarcane producer and typically one of the largest U.S. sugar quota recipients. Inadequate investments in recent years, however, have resulted in flat sugarcane production and inefficient milling operations. Increasing competition in the face of the full implementation of the region's free trade agreement (refer to section on Trade) is also forcing the industry to improve efficiency and explore new revenue generating ventures. According to the local ethanol industry association, investments into the industry in 2016 are expected to surge to \$770 million compared to around \$386 million in 2014.

According to the SRA, in 2014, there were eight (8) ethanol plants (double the number of distilleries in 2013) although only seven (7) were in operations. Three (3) ethanol plants are located in the main island of Luzon, and the remaining 5 distilleries situated in the Visayas group of islands. Aggregate capacity in 2014 was 222 MLi annually, considerably higher than the 133 MLi capacity in 2013. In 2014, 2 plants alternately use sugarcane and molasses as feedstock, and the remaining six (6) distilleries used molasses exclusively.

Two more potable alcohol plants with a combined capacity of at least 60 MLi (at 30MLi per plant) are expected to shift to fuel ethanol production in the second half of 2015, according to SRA contacts.

Adjustments needed to shift from potable alcohol to a fuel ethanol production are minimal (takes only 2-3 months), and cheaper (costs around \$2 million) compared to building a new facility, according to an industry contact. As a result, production will increase modestly in 2015 compared to the previous year's level. Increased output, however, will be challenged by an expected decline in sugarcane production in crop year (September/August 2015/16) as a result of a prevailing dry spell. Already, the SRA has made downward adjustments to its forecast (2.3 million tons from 2.5 million tons) and has signified its inability to fill the U.S. quota this year. More on ethanol production are discussed in the Consumption Section.

In 2016, the SRA expects 2 more beverage alcohol plants will shift to fuel ethanol with an estimated combined capacity of 60 MLi. Should the new plants operate, local ethanol production is still expected to fall short of demand requirements as aggregate capacity would represent only an estimated 68 percent of total demand.

By 2020, or when the current E10 is to be raised to E20, industry contacts project and Post confirms roughly 20 more plants (at around 30 MLi capacity each) will be needed to keep imports at zero level.

Industry, however, cannot rely on sugarcane alone as feedstock. While there are research and development efforts in using sweet sorghum (for conventional sugar fermentation) and lignocellulosic biomass as alternative or complementary feedstocks, there are serious challenges.

Commercial cultivation of sweet sorghum for fuel will require vast tracks of land, and is expected to be constrained by a longstanding Philippine agrarian reform law (which limits private land ownership to 5 hectares). 'Food vs. fuel' issues are also likely to crop up as Philippine agricultural lands are limited,

and the country is a net food importer. The development of commercial cellulosic fuel, on the other hand, will likely entail a much longer time or sometime closer to 2030.

Ethanol Used as Fuel (Million Liters)										
Calendar Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Beginning Stocks	0	0	0	0	0	0	0	0	0	0
Fuel Begin Stocks	0	0	0	0	0	0	0	0	0	0
Production										
Fuel Production	0	1	23	10	4	35	72	115	175	250
Imports										
Fuel Imports	3	13	64	140	215	248	297	339	302	251
Exports										
Fuel Exports	0	0	0	0	0	0	0	0	0	0
Consumption										
Fuel Consumption	3	14	87	150	219	283	369	454	477	501
Ending Stocks										
Fuel Ending Stocks	0	0	0	0	0	0	0	0	0	0
Total BalanceCheck	0	0	0	0	0	0	0	0	0	0
Fuel BalanceCheck	0	0	0	0	0	0	0	0	0	0
Production Capacity										
Number of Refineries	0	1	2	3	3	4	4	8	10	12
Nameplate Capacity	0	9	49	79	79	133	133	222	282	342
Capacity Use (%)	0	11%	47%	13%	5%	26%	54%	52%	62%	73%
Co-product Production (1,000 MT)										
Bagasse	0	5	92	46	0	18	78	102	102	102
Feedstock Use (1,000 MT)										
Sugarcane	0	15	308	154	0	62	262	338	338	338
Molasses	0	0	12	0	16	127	224	380	624	931
Market Penetration (Liters - specify unit)										
Fuel Ethanol	3	14	87	150	219	283	369	454	477	501
Gasoline	3,692	3,508	3,784	3,918	3,882	4,114	4,365	4,547	4,774	5,013
Blend Rate (%)	0.1%	0.4%	2.3%	3.8%	5.6%	6.9%	8.5%	10.0%	10.0%	10.0%

*Refers to capacity exclusive for fuel ethanol production.

Consumption

The Philippine economy grew by 6.1 percent in 2014 (one of the most robust in the region) and expected to continue expanding through at least 2016. As a result, fuel use is expected to increase through 2016. The DOE estimates local ethanol demand to have reached 455 MLi in 2014 and projects an average annual growth of 5 percent in the near future.

For the E20 target by 2020, there are challenges. An archipelago of more than 7,000 islands, the country's interisland transportation is largely inferior. Four (4) of the 5 distilleries in the Visayas are found on the island of Negros, which accounts for roughly 60 percent of domestic sugar production.

According to contacts, the distillers from Negros supply the ethanol requirements of the Visayas and the southern island of Mindanao (representing 30 percent of overall ethanol demand). The SRA estimates the cost of transporting ethanol out from Bacolod at P450 (\$10) per ton. According to the

same source, this is why new ethanol plants are being set up in Luzon, where 70 percent of the demand is. However, since Luzon has less than 40 percent of national sugar production, feedstock supply is an issue, and the CARP a constraint to expansion.

On the demand side, there are an estimated 8 million road transport vehicles in the Philippines. Gas-electric hybrid vehicle, as well as those that run on natural gas, comprise an estimated 1-2 percent of total motor vehicles. Rising incomes of the growing middle class have resulted in increased motor vehicle sales. According to a joint statement by the Chamber of Automotive Manufacturers of the Philippines Inc. and Truck Manufacturers Association, sales in the first half of 2015 reached 131,465 units from 108,957 units last year for a record 21 percent increase. The current composition of the existing vehicle fleet, however, is not so encouraging. The number of flexi-fuel vehicles account for only a minor segment (estimated at 10-20 percent) of Philippine road transport vehicles, according to contacts from an oil company.

Of more serious concern, according to experts, is the widening gap between petroleum gas and local ethanol prices. From roughly P51 (\$1.13) per liter in June 2014, local ethanol prices increased 10 percent to over P56 (\$1.25) per liter in June 2015, the highest in about 4 years. Local gasoline (RON 95) pump prices, on the other hand, have declined by roughly 25 percent from around P51 (\$1.13) price per liter in June 2014, to roughly P45 (\$1.0) per liter in June 2015. Local petroleum companies have already reduced prices of fuel products around 15 times since the start of 2015 reflecting the continued downward movements in oil prices in the world market. Consumers, however, are not likely to experience the full price decline of RON95 as a result of increasing ethanol prices. Already there have been critics of the biofuels program claiming it has effectively increased local gasoline prices.

Trade

The Association of Southeast Asia Nations Free Trade Agreement (AFTA) promotes intra-regional trade by lower tariffs applicable to products of ASEAN-members. Tariff rates on all products (with a few exemptions such as Philippine rice) in the ASEAN region fell to between zero and 5 percent in 2011 under the framework of the ASEAN Trade in Goods Agreement (ATIGA). Executive Order 61 (EO 61) was issued on October 17, 2011 (and took effect in January 2012), providing the updated tariff structure for the period 2011-2015. Duties for ethanol from the region are at 5 percent through 2015.

This compares to the Most Favored Nation tariff of 10 percent from WTO-member countries including the United States. An additional one percent duty is imposed if to be used for fuel-blending purposes under the Philippine Fuel Ethanol Program.

Although Section 5.2 of the Biofuels Act allows ethanol importation only up to 4 years after implementation of RA 9367 (or through 2013), consistent production shortages have forced the DOE to allow imports. As a result, compliance with the ethanol mandate has largely been met by imports which have been increasing since 2009.

Fuel ethanol imports increased 14 percent in 2014 reaching 339 MLi from 297 MLi in 2013, according to data from the DOE. Imports from the U.S. more than tripled reaching 246 MLi in 2014 from 75 MLi in 2013, and accounted for a dominant 73 percent of total imports. According to U.S. Census data, the Philippines was the 4th largest market for U.S. ethanol in 2014, with sales reaching over \$160 million, the highest on record. Coming in second were Indonesia and Vietnam with sales of 28 MLi each, or roughly eight percent of total imports in 2014. Third largest supplier in 2014 was Brazil with a 4

percent share of overall imports. Imports from Thailand, an ASEAN country that was second largest exporter in 2013, declined in 2014 as it imposed a higher E20 blend, and directed local ethanol production to its domestic market.

Ethanol Imports (Million Liters), 2012-14			
Country of Origin	2012	2013	2014
Australia	27	17	
Brazil		45	14
Indonesia	-	6	28
Korea	4	2	2
Philippines (Subic)	93	49	12
Singapore	23	3	3
Thailand	89	39	4
USA	7	75	246
Vietnam	6	27	28
Others		33	0
Total	248	297	339

*Preliminary

Source: Sugar Regulatory Administration and Department of Energy

The Subic Freeport is a Special Economic Zone of the Philippine Economic Zone Authority (PEZA). PEZA-registered ethanol companies enjoy special incentives (tax holidays and credits). The countries of origin of the ethanol imports, however, are not specified by the SRA data.

Imports in 2014 accounted for about 75 percent of total 2014 domestic use compared to the 80 percent level in 2013. The import: demand ratio is likely to further abate to 63 percent in 2015 and 50 percent in 2016 as production increases, and imports likely to decline through 2016. No ethanol exports are expected through 2016 due to inadequate production.

On July 21, 2015, amendments to the Cabotage Law embodied in Republic Act 10668 (RA 10668) was approved by President Benigno Aquino III. RA 10668 allows foreign ships to transport import or export cargo directly to and from any local port other than the Port of Manila. RA 10668 is expected to result in lower cost of importing products to the Philippines, and will facilitate imports from all countries. It is also expected to help decongest the main port in Manila which experienced congestion problems and disrupted trade flows in 2014. Implementing guidelines, however, have yet to be issued.

Stocks

Stocks are Post's estimates. Stocks remain zero through 2016 as a result of inadequate production.

IV. Biodiesel

Production

The Philippines was the top coconut oil exporter in 2014. Copra (the dried meat of the coconut) production in market year (MY) 14/15 declined from the MY 13/14 level due to the negative impact on production from typhoon Haiyan (which passed through the Philippines in November 2013) and an anticipated cyclical decline in yields. Output is expected to slightly increase (to 2.30 million tons) in MY 15/16 assuming favorable weather.

An estimated 50 active coconut oil (CNO) mills operate in the country, and around 20 cater to the export market while roughly 30 concentrate in servicing domestic CNO needs, according to industry contacts. Coconut methyl ester (CME) is the main Philippine biodiesel feedstock, and is an oleochemical derived from CNO. CNO is obtained from crushing copra. Oleochemicals are used in the manufacture of soaps, detergents and other cosmetic items and toiletries.

According to the DOE, there were 11 registered and operational biodiesel refineries in 2014, unchanged from the previous year, with an aggregate annual capacity of 585 MLi. Seven (7) CME producers operate in the island of Luzon, 3 in Mindanao, and one plant in the Visayas islands. In 2012, the same number of refineries was registered but only nine (9) were operational. Total capacity increased 48 percent from 393 MLi in 2013 to 585 MLi in 2014.

Based on DOE data, except for 2010, biodiesel production has been increasing since the implementation of the Biofuels Act. Capacity utilization has, so far, been below half of total capacity through 2014.

CME production and capacity utilization in 2015 are expected to increase from the previous year's level as producers build up stocks, before surging in 2016 to comply with the programmed increase in the blend mandate. From 33 percent in 2015, capacity utilization is expected to increase to 60 percent in 2016.

Biodiesel (Million Liters)										
Calendar Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Beginning Stocks	0	1	2	7	6	16	17	19	28	10
Production	49	66	137	124	133	138	155	172	152	360
Imports	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	48	64	131	125	123	137	153	163	170	360
Ending Stocks	1	2	7	6	16	17	19	28	10	10
BalanceCheck	0	1	1	0	0	0	0	0	0	0
Production Capacity										
Number of Biorefineries	8	8	10	8	9	9	9	11	11	11
Nameplate Capacity	350	350	350	436	350	393	393	585	585	585
Capacity Use (%)	14.0%	18.9%	39.1%	28.4%	38.0%	35.1%	39.4%	29.4%	26.0%	61.5%
Feedstock Use (1,000 MT)										
Coconut Oil	45	60	125	113	122	126	142	157	139	329
Market Penetration (Liters - specify unit)										
Biodiesel, on-road use	48	64	131	125	123	137	153	163	170	360
Diesel, on-road use	5,062	5,080	5,454	5,631	5,566	5,819	6,187	6,579	6,908	7,253
Blend Rate (%)	0.9%	1.3%	2.4%	2.2%	2.2%	2.4%	2.5%	2.5%	2.5%	5.0%
Diesel, total use	7,253	7,616	7,920	8,237	8,567	8,866	9,177	9,498	9,783	10,076

Consumption

The current 2 percent biodiesel blend is to be raised to 5 percent by 2015, as stipulated by RA 9367.

The local industry was supportive of increasing the blend one year in advance or in 2014, but this did

not happen. Although the PCA and the local industry were confident copra and CNO supply would be adequate to comply with the 5 percent CME requirement even before 2015, local oil companies raised technical questions and the GPH had wanted more information on the economic impact of the higher biodiesel mandate. The economic impact study was contracted to a university, and will likely be completed in the last quarter of 2015. The establishment of the appropriate Philippine National standard (PNS) for B5 is also moving forward, according to industry contacts.

Philippine biodiesel consumption in 2015 is expected to increase by roughly 5 percent from the 2014 level due to the improving economy, before increasing significantly (more than double or 111 percent) as the CME blend is raised to 5 percent compared to the 2014 level of 2.5 percent.

By 2020, the required biodiesel blend will be raised to 10 percent, per RA 9367. At this level, roughly 900 million liters of CME would be required. At a 10 percent blend, however, local CNO supply would be inadequate, and diverting it to CME production would displace CNO for other uses. At present, there are plans to add palm oil to the blend mix.

Trade

There is no provision for biodiesel importation in the Biofuels Act.

Ending Stocks

Biodiesel stocks are to likely decline in 2015, compared to the previous year's level as CME production declines as a result of weak copra supply. For 2016, no significant change in inventories is expected as CME production accelerates as a result of full implementation of the higher 5 percent blend.

V. Advance Biofuels

RA 9367 mandates a B20 blend by 2030. According to a local expert, algal biodiesel would be necessary to augment feedstock supply in order to comply with the higher mandate. There is little information on current research and development for cellulosic fuel available, as well as on demonstration plants that prove the commercial viability of advanced biofuels technology.

VI. Notes on Statistical Data

The numbers on the Fuel Use Projections Table are guided by the following assumptions:

- Fuel use assumptions are based on DOE estimates reported in thousand barrels (MB) through 2014. These were converted using $MLi = MB \times 159/1000$.
- Gasoline, diesel and jet fuel use estimates from 2015 through 2025 use an initial 5 percent growth rate (consistent with the DOE's projected average growth in annual fuel use) declining slightly to 4 percent starting 2018 (through 2020), 3.5 percent in 2021 to 2023, and to 3 percent in 2024 and 2025.
- Ethanol consumption numbers are Post's estimates and are based on the tightness of local ethanol supply with zero carryover stocks.
- Biodiesel consumption estimates are based on CME sales numbers from the DOE.

A metric ton of sugarcane: 65 liter fuel ethanol conversion rate is used with a sugarcane co-product (bagasse) recovery of 300 kilos (kg) per ton cane. On the other hand, potable alcohol plants use

molasses for fuel ethanol production a rate of a ton of molasses: 245 liters of ethanol.

The following copra: CNO:CME conversion rate is used in this report based on the Coconut Industry Development Roadmap (2011-2016) of the Philippine Coconut Authority (PCA).

$$\begin{aligned} 1 \text{ kg. Copra} &= 0.63 \text{ kg. CNO} \\ 1 \text{ kg. CNO} &= 1 \text{ liter CME} \end{aligned}$$